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ABSTRACT

Summarizes findings from a study of the emerging Information Technology function of community college "Chief Information Officers" (CIOs). According to the author, rapid changes in both technological environments and in the expectations of what technology will be used for have significantly shaped CIO responsibilities within community colleges. The following elements of the CIO job were examined at 23 community colleges: (1) the level of authority and placement in the executive decision-making structure; (2) key functions of the job with respect to support for administration, instruction and learning, and integration of information technology and communications across campus; and (3) the nature of the most recent job redesign and the reasons for it. The data was gathered though the implementation of an online survey of community college CIOs, follow-up telephone interviews with selected CIOs and college presidents, examination of instructional Web sites and other public documents, and background research using the U.S. Department of Education IPEDS database. The author reports findings on the following themes: (1) frequent design and redesign of CIO position; (2) variety of job titles and reporting arrangements; (3) job responsibilities; (4) CIO and the learning environment; and (5) organizational configurations. (RC)

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SUMMARY OF FINDINGS

THE CHIEF INFORMATION OFFICER: JOB AND ORGANIZATION DESIGN IN THE COMMUNITY COLLEGE

Dissertation research conducted in 2001-02 by Bob Barber,
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The study concerned the emerging Information Technology function of "Chief Information Officer" (CIO) in community colleges. This function is assigned to individuals with a variety of job titles in different institutions; for ease of reading I will use the term "job."

The holder of this position manages information technology resources and support within the institution and is generally a member of the President's leadership team or cabinet to ensure the integration of the IT Department at the highest strategic level of the institution.

This CIO function is emerging in community colleges because of rapid change in both the technological environment and in the expectations of what technology will be used for. Information technology is playing an increasingly central role in learning environments and instructional programs as well as administrative systems. Further, the distinctions between these types of systems are blurring as "administrative" systems increasingly have "instructional" components and are increasingly central to student communication with institutions, instructors, and each other.

The focus of this study was not the long list of technological and organizational issues facing CIOs and their institutions as are reported in the EDUCAUSE Current I. T. Issues Surveys and the Campus Computing Project's Annual Campus Surveys. Rather I examined the following elements of the CIO job at 23 community colleges*.

- The level of authority and placement in the executive decision-making structure.
- The responsibilities of the job (key functions), in the areas of:
  - (a) Support for administrative functions
  - (b) Support for instructional and learning functions
  - (c) Integration of IT functions and communications across the institution.
- The nature of the most recent job redesign and the reasons for it.

* The 23 colleges are among 70-plus community colleges identified by the League for Innovation in the Community College as making a particular effort to be "learning centered."

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The Context: Technological Convergence in the Community College

There is a particular intersection of issues regarding information technology that is impacting community colleges. Computers are a new technology, yet they have moved quickly to the heart of organizational mission and organizational design for community colleges, in three distinct ways. First, computer skills are now basic literacy skills - all students need them. Second, community colleges deploy and utilize information technology at the core of their institutional processes, and increasingly so in a manner which allows students direct interaction with these processes. Third, computer technology is moving into the core of the learning process itself, presenting faculty with the challenge of learning new skills and the institution with the challenge of supporting them.

Surveys in the last seven years have consistently indicated that the use of technology in instruction is, along with generally meeting user support demands, the most pressing issue for CIOs in higher education. Community colleges in particular face a series of issues in considering the use of technology in the teaching and learning process. The following data is taken from the Campus Computing Project's annual surveys, conducted among 500-600 institutions of higher education. These surveys use the categories of public and private community colleges, 4-year colleges, and 4-year universities. The data summarized here will be restricted to public institutions. In the survey samples reviewed here, the number of public community colleges ranged from 108 to 225, a range of 21% to 34% of the total sample. (Green, 1995, 1996, 1998, 2000, 2001).

The Need to Clarify IT Goals was the strategic issue of most concern to community college IT leaders, in 1995 and 1996. In 2001 this issue was surpassed slightly by the problem of providing IT training for the in-house IT staff.

Strategic planning for technology has increased rapidly in community colleges since the mid 1990s. In 1996, 38.7% of colleges had strategic technology plans and another 33.3% were preparing them at the time. By 2001, 57.9% of colleges had such plans and another 29.9% had plans in preparation (totaling 87% of survey participants).

A higher percentage of community college survey participants reported having a formal plan for using technology instruction than did 4-year public colleges and 4-year public universities. In 1995, 30.6% of community colleges reported having such plans; by 2000, 46.2% so reported.

In 1995, when the Internet was relatively "new" as an educational tool, a higher percentage if community colleges reported having plans for integrating the World Wide Web and the Internet into instruction, than did 4-year public colleges and 4-year public universities. By 2000, 46.2% of the responding community colleges had such formal plans.

This convergence is also seen at the colleges examined in this study.

One indicator is the use by students of computer based or online methods to access college services and business process as well as to participate in or take their courses.

With the exception of one that is just beginning to offer web-based instruction, every college surveyed has an established online learning program offering anywhere from a few dozen to over 100 courses in Spring Term 2002.

Colleges may also purchase special software for managing online courses or portions of courses. This would add to whatever functionality for web-based course management has been developed in-house by faculty or by IT staff. 20 of the 23 surveyed colleges support one or more of the commercial systems such as WebCT or Blackboard, and the other three have district- or college-based course management systems.

On the business process side, the addition of Internet-based (online) access to paper-based and voice-based modes of communication and transaction processing within community colleges parallels the trend toward online or electronic information processing throughout North American society. The majority of colleges surveyed either have or are implementing online applications, class registration, and other processes.

Table 1. Student Access To Information and Processes Online

Student Process	Yes	No	Upcoming
Application Online	15	7	1
Register for Classes Online	14	5	4
Get Schedule Online	16	4	3
Get Unofficial Transcript online	16	6	1
Using or in conversion to an integrated system for the above. Yes - Programmed In House Yes - Commercial Vendor	 6 15	2	

A second indicator of technology convergence is the increasing need for faculty to learn new skills and develop new forms of communication and interaction with students. The rapid diffusion of information technology in the educational environment has led increasing numbers of community college faculty to undertake learning new methods and incorporating new practices into their instructional design.

All of the colleges surveyed have instructional technology centers or other programs to assist faculty in learning new skills, with paid for supporting faculty in learning how to use

technology in their courses. 21 of the 23 have designated funds for professional development or curriculum development using technology.

During the late 1990s, the responding community colleges spent considerable time on reorganizing their Information Technology units. According to Campus Computing Project survey data, in 1998 over half the responding community colleges said they had reorganized one or more of academic or administrative computing functions within the past two years. In 2000, 49.1% of the responding community colleges indicated they have Chief Information Officer (CIO) or a Chief Technology office (CTO). Another 6.6% had it under discussion.

Summary of Findings

Data were gathered about CIO job design at 23 community colleges in 16 U.S. states and 1 Canadian province, including colleges with academic and general expenditures of less than $10 million to over $100 million, with enrollments of a few thousand to over 25,000 in credit programs, and with faculties of fewer than 100 to well over 1000 full-time and part-time instructors. Although about half were in single-college districts with one campus, the pool included multi-campus single-college districts, multi-college districts, and community colleges placed in a larger state system of higher education.

This data was gathered in the following ways: An online survey of community college CIOs; follow-up telephone interviews with selected CIOs and college presidents; examination of institutional web sites and other public college documents such as job descriptions and organization charts; background research in the U.S. Department of Education higher education IPEDS database and in the results of an ongoing national survey of computing in higher education.

Frequent Design and Redesign

Of the 23 responding colleges, only two reported no change in the CIO job in the last five years. 15 of the 23 jobs were changed in the last two years and of those 15, 8 jobs were entirely new. 2 job redesigns involved contracting out the position to a private firm.

Among the reason most often stated for the recent redesign, were alignment of I. T. with the overall institutional mission, the need for integration of elements of the institution supporting I. T., and the need for focus within I. T. to ensure greater effectiveness.

In 8 cases, the job design or redesign was part of an organizational change plan and/or overall restructuring of the institution's leadership. In at least 4 cases, the job design or redesign was related to a crisis, either organizational, or technical, or both. Survey comments stresses the lack of credibility or effectiveness in IT as a factor in causing the job design or redesign.

Variety of Job Titles and Reporting Arrangements.

The respondent colleges in this study use a wide variety of job titles to designate their CIO (in addition to Chief Information Officer) among them Vice President or Vice Chancellor, Associate Vice President, Dean or Assistant Dean, and Director or Executive Director. The number of job titles also suggests this is not a stable concept.

About half the CIOs reported directly to the President of the institution. The other half reported to various vice presidents or deans. Of those 11 reporting to an administrative or academic vice president provost, four sit on the president's cabinet or executive team anyway and 7 do not. This study did not explore the ramifications of this very important question. However, it is notable in recent reorganizations among the respondent colleges, some had moved the CIO into a closer reporting relationship to the president, and others had moved in the job in the opposite direction.

Job Responsibilities: Common, Uncommon, and Mixed

Several infrastructure responsibilities (for example, maintaining the college computer network) were held by nearly all respondents,

Table 2. CIO Responsibilities: Common

Responsibility	Yes	No	NA
Purchase Hardware & Software	23	0	0
Classroom Technology	22	1	0
Data Infrastructure	20	2	1
Computer Center	20	3	0
Maintain Network	20	2	1
Instructional Labs	19	4	0
Research Data	17	5	1
Distance Learning	17	4	2

In Table 2 (above) traditional functions such as programming, database management, and network operations stand out. As a general matter, these would be functions that have served primarily the faculty and other staff of them institution. Other elements are now also common which are related to the infrastructure of the learning environment for students: classroom technology, instructional computer labs and distance learning. The common responsibilities include those having to do with the maintenance of the hardware and software infrastructure for college administrative functions as well as for classrooms, distance learning, and computer labs.

On the other hand, the uncommon responsibilities (within an information technology framework) were those having to do with the academic program: directly teaching computer science to students or conducting computer-related job training.

In Table 3 (below), functions associated with the academic program of a college are almost completely outside the scope of responsibilities of CIOs. In one exception, the network operations degree program has been transferred from the computer science department (academic) to the IT department. And those indicating responsibility for computer literacy programs indicated they were for faculty or staff not part of the general student program of the college.

Table 3. CIO Responsibilities: Uncommon

Responsibility	Yes	No	NA
Computer Science Teaching	0	20	3
Technology Programs	0	19	4
IT Job Training	1	19	3
Computer Literacy Programs	3	15	6

I conclude that Tables 2 and 3 reflect a relatively stable division of labor, to ensure well-established missions, between the functions of the central Information Technology Department and those reserved for the "academic side of the house."

On the other hand, there was a group of responsibilities that exhibited a more unstable pattern. Table 4 reveals a much more unstable pattern, in which a number of functions, arguably having to do directly with the learning environment for students, are included or not in CIO responsibilities. Here is a realm of changing missions, perhaps for the institutions and perhaps for the Information Technology Department.

Table 4. CIO Responsibilities: Mixed

Responsibility	Yes	No	NA
Student Learning	16	6	1
Faculty Training	14	9	0
Library IT	13	10	0
Underprepared Students	8	12	3
Curriculum Development	7	11	5

These responsibilities have to do with the learning environment for students. It is here that the grappling that institutions are doing with how to structure their CIO job is most evident. Particular emphasis in this discussion will be given to the issue of training faculty and helping faculty integrate technology into instruction. There is ample data this is a prime concern of CIOs and of faculty, but the ways colleges approach it are many and varied.

CIO and the Learning Environment

Some job responsibilities supporting the learning environment are commonly assigned to CIOs, such as classroom technology (22 of 23), large-scale computer labs (18 of 23), and distance learning infrastructure (17 of 23).

However, data presented in greater detail in Table 4 above show that some responsibilities having to do with creating the learning environment for students may or may not be assigned to the CIO. These include the Library, Faculty Training, Curriculum Development, Underprepared Students, and Student Learning

Of the CIOs, 16 of the 23 stated Student Learning was a responsibility of theirs through units they manage for instructional labs, classroom technology, or distance learning. Of the 17 job descriptions obtained from responding CIOs, 7 (about 40%) directly reference "student learning" or "learning centered" or "educational environment." Others reference supporting institutional mission as well as "instructional" or "academic" computing or technology, again suggesting the value of further investigation into the meaning attached to such terms as they influence organization and job design.

Of the responding CIOs, 8 indicated support for underprepared students was among their responsibilities, through programs to support computer-assisted instruction and the teaching of remedial skills.

In the survey sample, 4 of the 23 CIOs have the library in its entirety under their authority. However, 13 of the CIOs have the library's IT systems under their management, while 10 do not. Of those that do not, at least 3 still provide the network infrastructure for the library even if the library has its own IT specialists.

Among survey respondents, 14 of the 23 have responsibility for the center and/or program through which faculty learn and practice using technology in their curricula, whether in a classroom environment or through various forms of "distance" learning.

Only 7 indicated they had some responsibility for Curriculum Development.

A new integrator function?

Researchers have identified the role of "integrator" in matrix management situations as a manager from one department assigned to effect coordination with others across the matrix. The CIO does not truly fit this description. However, it is very common for the CIO to be expected to play the role of integrating functions, processes and people across many different kinds of boundaries within the organization.

The national data and my survey data show that a large majority of the CIOs have started or been involved with the process of integrating academic and administrative computing. In this framework academic computing refers not to the teaching of computer science but the support of computers in classrooms, labs, where students use them as tools in their courses. According to the Campus Computing Project's annual surveys, the percent of community colleges in which academic and administrative computing are combined under one department rose from 48.4% in 1995 to 63.2% in 2000. (Green, 1995, 2000). Of the CIOs surveyed here, 8 were at colleges where the merger had already taken place and 12 had initiated

the process of integration themselves. Only 3 of the colleges surveyed here have not combined these support services.

At least 11 of the 23 respondents initiated other forms of restructuring within the IT Department as well.

Finally, at least 16 of the 23 CIOs have been involved in or started other forms of cross-boundary communication as well. The following are among the computer-based instances reported, some multiple times each: Use of Email; Use of the World Wide Web for Student Services; Intranet; Internet portal; Helpdesk with Web interface centralizing request tracking.; New Learning Support System; cross-departmental technology committees..

Organizational Configurations: Common and Unusual

Four structural configurations emerged into which the 23 colleges can be placed. Two of the four configurations described below in Chapter 8 are common, and two are uncommon.

In what I call the Standard Model (Figure 1), the CIO manages programming and database administration, the Network Operations unit and the User Support unit. To these basic core functions, in the surveyed colleges, we find varying instances of adding oversight of the Library to the CIO job, and of adding oversight of the Institutional Research and Planning function. 7 colleges had this configuration.

In the Standard Model Plus Faculty Training Model (Figure 2), responsibility for training faculty in how use information technology in their teaching is added to the responsibilities of the CIO. Every college surveyed had such a center and/or program, and in 14 of them the CIO was responsible.

In the Student Services Model (Figure 3), the Information Technology Department is combined with Student Services such as Financial Aid, Admissions and Records, and Counseling and the CIO job is combined with that of Vice President for Student Learning or Educational Services. 2 colleges had this configuration.

In the Academic Leadership Model (Figure 4), the CIO reports not to the Financial or Operations Vice President but directly to the Academic Vice President or equivalent. 1 of the 23 colleges studied had this design.

Figure 1 is presented on the following page.

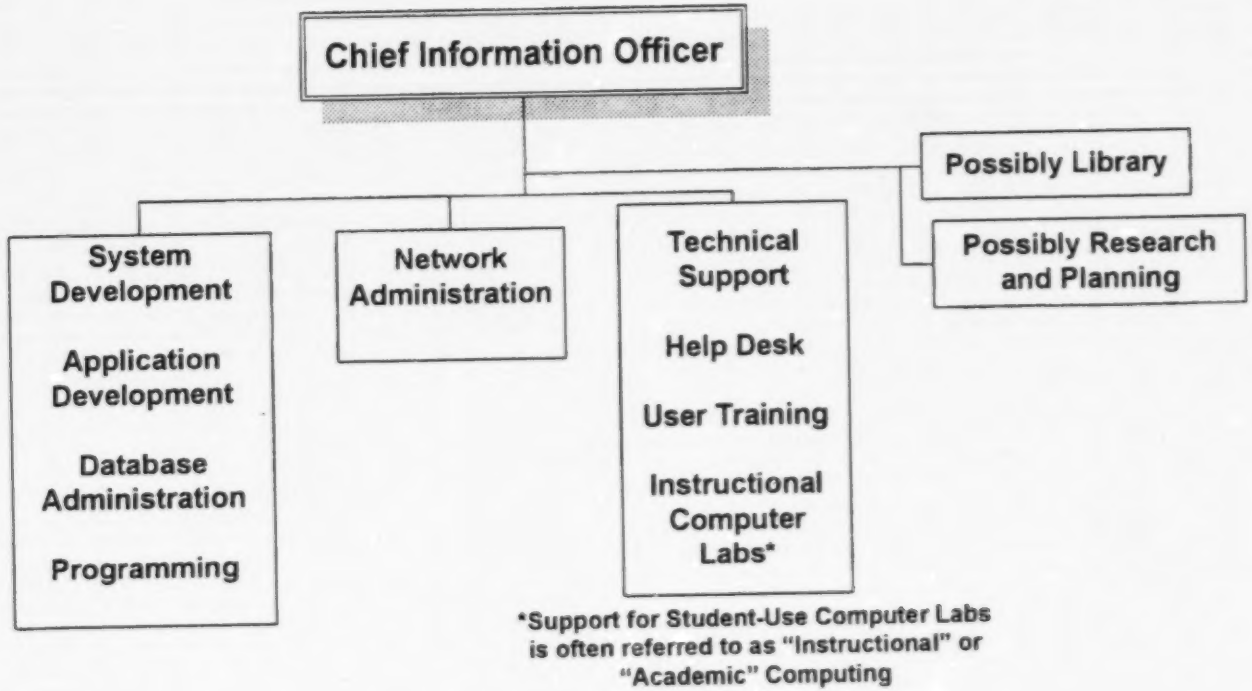

Figure 1. Standard Configuration for an Information Technology Department

Note: This figure is not intended to represent any single institution

Figure 2 (next page) is constructed on top of Figure 1. Figure 2 shows the addition of the faculty technology training center and/or program to the responsibilities of the CIO. Every college surveyed had such a center and/or program, and in 14 of them the CIO was responsible. These centers are staffed sometimes by faculty and sometimes by members of the institution's "support" or "classified" staff, with job titles like Instructional Designer or Instructional Technologist.

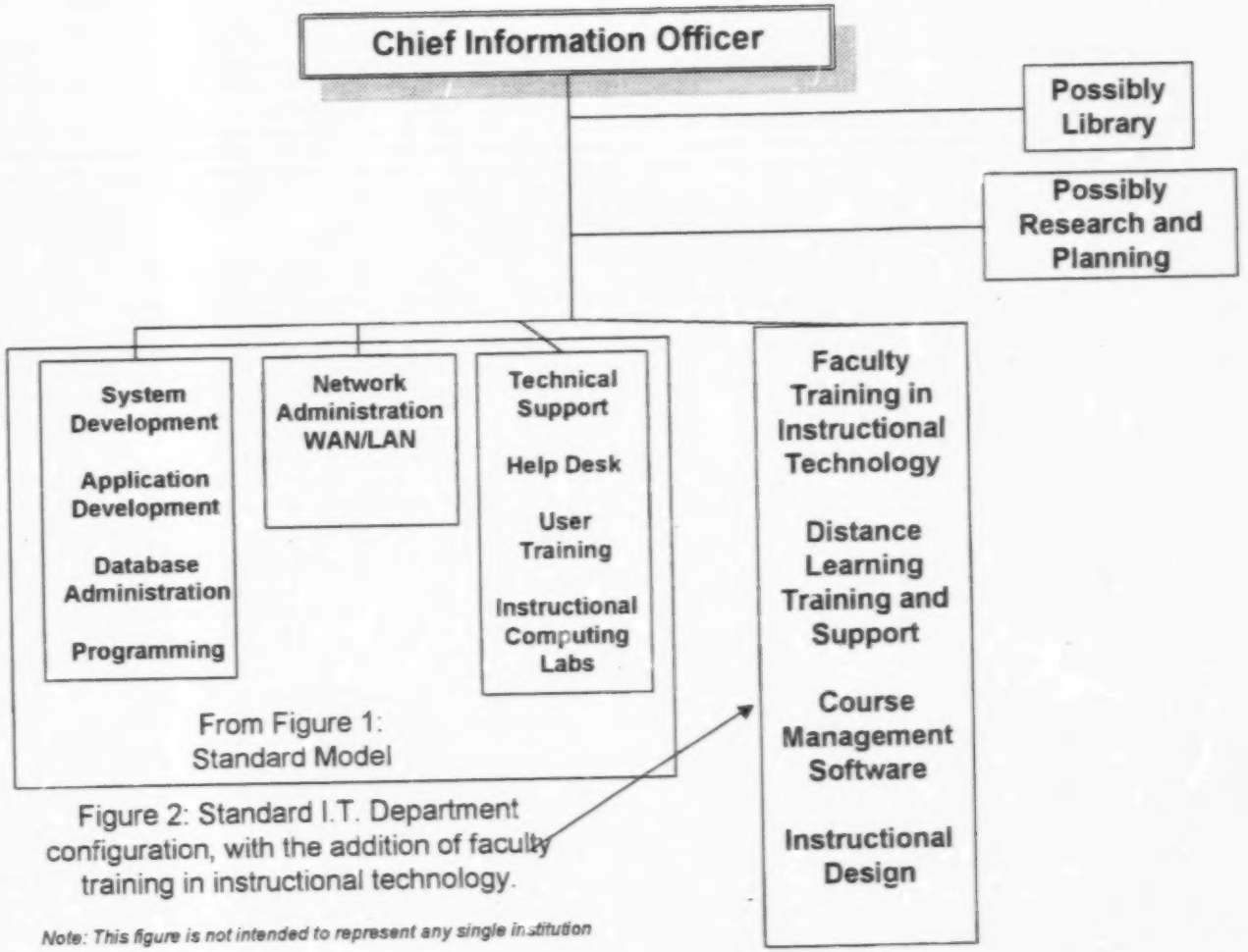

Figure 2: Standard I.T. Department configuration, with the addition of faculty training in instructional technology.

Note: This figure is not intended to represent any single institution

Of the configurations that emerged from the data, the most interesting outliers are found in Figures 3 and 4.

In Figure 3 (next page), the Information Technology Department is combined with Student Services such as Financial Aid, Admissions and Records, and Counseling. In the two cases of this type, the respondent CIOs explained that services to students are considered largely an information management issue. This is a substantially new way of thinking about both IT and Student Services.

(Further investigation may also reveal in these cases or ones like them, cost savings is an additional element driving the consolidating of management positions.)

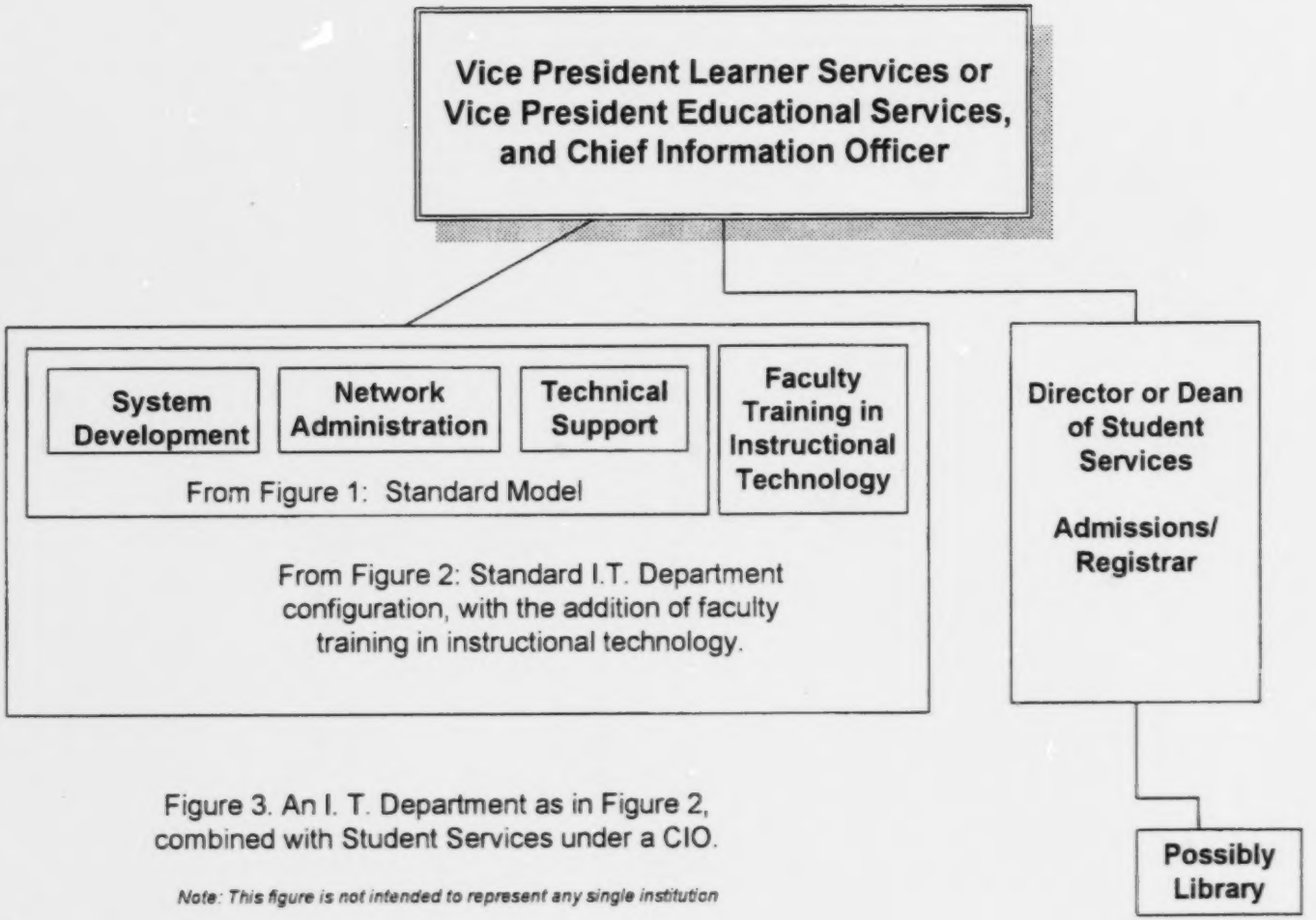
Vice President Learner Services or Vice President Educational Services, and Chief Information Officer
System Development
Network Administration
Technical Support
Faculty Training in Instructional Technology
From Figure 1: Standard Model
From Figure 2: Standard I.T. Department configuration, with the addition of faculty training in instructional technology.
Director or Dean of Student Services
Admissions/ Registrar
Possibly Library

Figure 3. An I. T. Department as in Figure 2, combined with Student Services under a CIO.

Note: This figure is not intended to represent any single institution

In contrast to associating IT and the CIO job with Student Services, an alternate design associates them with the academic structure of the college by placing the CIO directly under the Academic Vice President. This is yet a different way of considering IT -- as primarily related to the learning process rather than as primarily related to administrative and business processes. Figure 4 (next page) demonstrates this configuration, found in 1 of the 23 colleges studied.

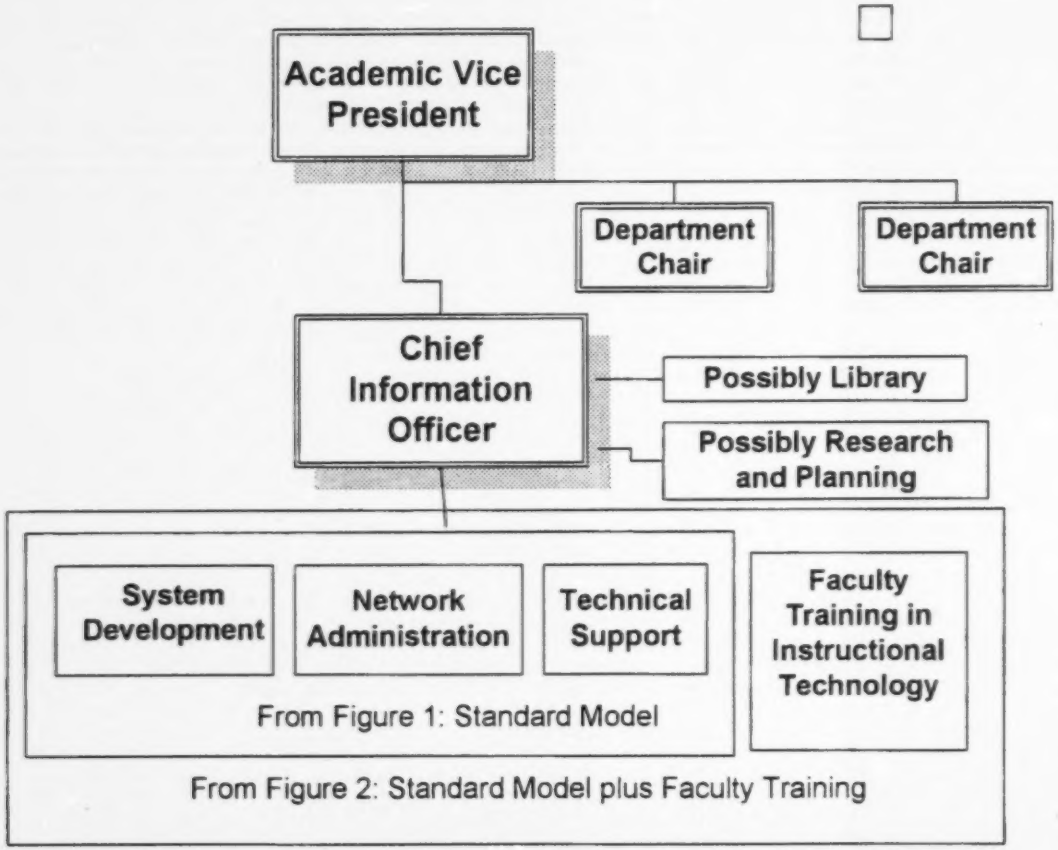

Figure 4. An I. T. Department as in Figure 2, but placed under the Academic Vice President

Note: This figure is not intended to represent any single institution

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